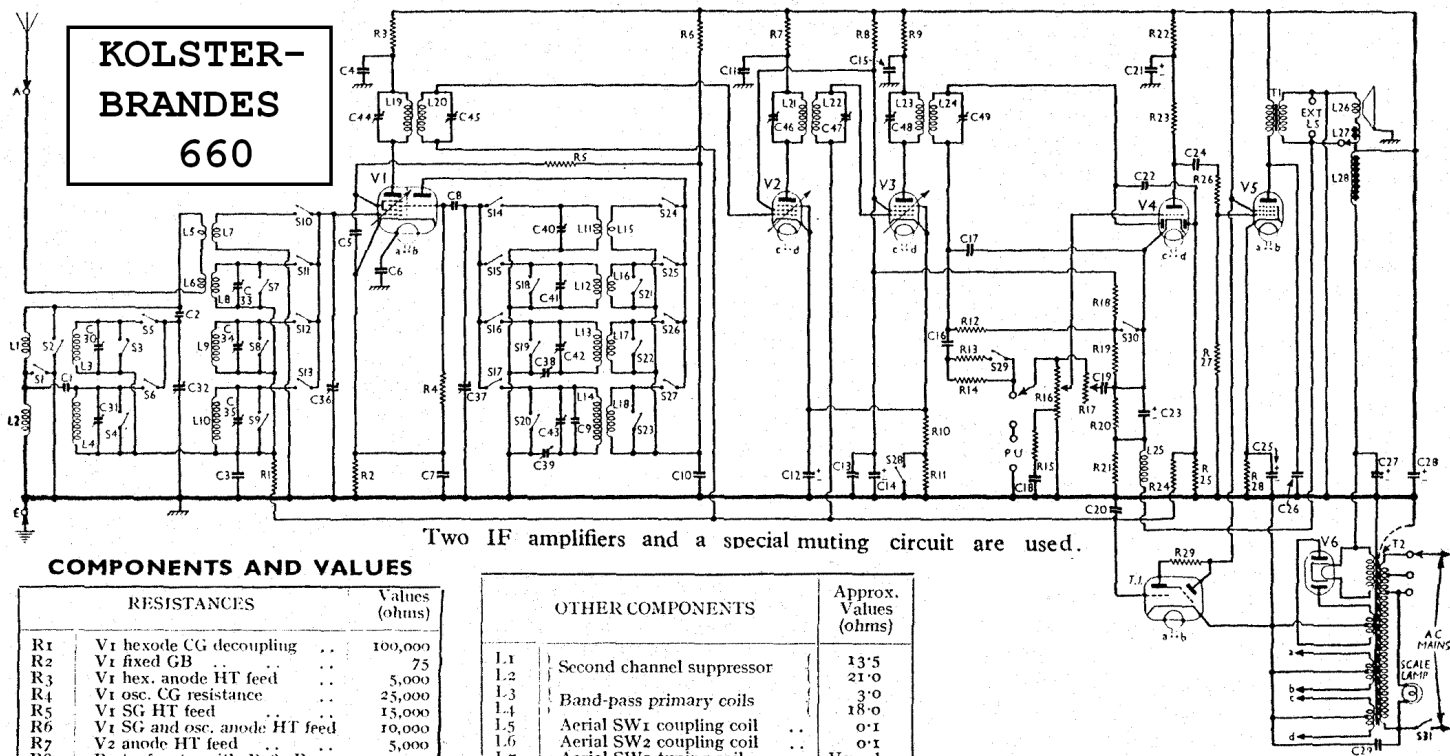


# KOLSTER-BRANDES 660



## COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 hexode CG decoupling	100,000
R2	V1 fixed GB	75
R3	V1 hex. anode HT feed	5,000
R4	V1 osc. CG resistance	25,000
R5	V1 SG HT feed	15,000
R6	V1 SG and osc. anode HT feed	10,000
R7	V2 anode HT feed	5,000
R8	Part of pot., with R18, R19, R20	20,000
R9	V3 anode HT feed	5,000
R10	V3 fixed GB	300
R11	V3 fixed GB (MW and LW)	250
R12	V4 signal diode load	500,000
R13	IF stopper resistances	100,000
R14	Part of tone compensator	5,000
R15	Manual volume control	500,000*
R16	Variable tone control	500,000
R17	V2, V3 SG's; muting potential; V4 triode GB and AVC delay potential divider with R8	10,000
R18		2,000
R19		300
R20		40
R21	Negative feed-back coupling	50,000
R22	V4 triode anode decoupling	250,000
R23	V4 triode anode load	500,000
R24	AVC line decoupling	500,000
R25	V4 AVC diode load	7,000
R26	V5 grid IF stopper	100,000
R27	V5 CG resistance	150
R28	V5 GB resistance	2,000,000
R29	T.I. anode HT feed	2,000,000

\* Tapped near chassis

CONDENSERS		Values (μF)
C1	Aerial LW coupling	0.000018
C2	Aerial MW coupling	0.000018
C3	Band-pass coupling	0.02
C4	V1 hex. anode decoupling	0.1
C5	V1 SG decoupling	0.1
C6	V1 heater RF by-pass	0.0001
C7	V1 cathode by-pass	0.1
C8	V1 osc. CG condenser	0.00005
C9	Osc. circuit LW fixed trimmer	0.00007
C10	V1 osc. anode decoupling	0.1
C11	V2 anode decoupling	0.1
C12*	V2, V3 cathodes by-pass	25.0
C13	V2, V3 SG's RF by-pass	0.1
C14*	V2, V3 SG's decoupling	2.0
C15	V3 anode decoupling	0.1
C16	AF coupling to V4 triode	0.02
C17	IF by-pass	0.0005
C18	Part of tone compensator	0.05
C19	Part of variable tone control	0.003
C20	AVC line decoupling	0.1
C21*	V4 triode anode decoupling	2.08
C22	Coupling to V4 AVC diode	0.00012
C23*	V4 cathode by-pass	25.0
C24	V4 triode to V5 AF coupling	0.02
C25*	V5 cathode by-pass	25.0
C26	IF by-pass	0.0005
C27*	HT smoothing	16.0
C28*		16.0
C29	Mains RF by-pass	0.01
C30*	Band-pass pri. MW trimmer	—
C31*	Band-pass pri. LW trimmer	—
C32*	Band-pass primary tuning	—
C33*	Aerial SW2 trimmer	—
C34*	Band-pass sec. MW trimmer	—
C35*	Band-pass sec. LW trimmer	—
C36*	SW aerial and band-pass secondary tuning	—
C37†	Oscillator circuit tuning	—
C38†	Osc. circuit MW tracker	—
C39†	Osc. circuit LW tracker	—
C40†	Osc. circuit SW1 trimmer	—
C41†	Osc. circuit SW2 trimmer	—
C42†	Osc. circuit MW trimmer	—
C43†	Osc. circuit LW trimmer	—
C44†	1st IF trans. pri. tuning	—
C45†	1st IF trans. sec. tuning	—
C46†	2nd IF trans. pri. tuning	—
C47†	2nd IF trans. sec. tuning	—
C48†	3rd IF trans. pri. tuning	—
C49†	3rd IF trans. sec. tuning	—

\* Electrolytic. † Variable. ‡ Pre-set.  
§ May be 10μF in a block with C23.

## OTHER COMPONENTS

		Approx. Values (ohms)
L1	Second channel suppressor	13.5
L2		21.0
L3	Band-pass primary coils	3.0
L4		18.0
L5	Aerial SW1 coupling coil	0.1
L6	Aerial SW2 coupling coil	0.1
L7	Aerial SW1 tuning coil	Very low
L8	Aerial SW2 tuning coil	Very low
L9	Band-pass secondary coils	3.0
L10		18.0
L11	Osc. circuit SW1 tuning coil	Very low
L12	Osc. circuit SW2 tuning coil	0.05
L13	Osc. circuit MW tuning coil	3.5
L14	Osc. circuit LW tuning coil	7.5
L15	Oscillator SW1 reaction	0.1
L16	Oscillator SW2 reaction	0.1
L17	Oscillator MW reaction	1.8
L18	Oscillator LW reaction	2.3
L19	1st IF trans. Pri...	18.5
L20	1st IF trans. Sec...	18.5
L21	2nd IF trans. Pri...	18.5
L22	2nd IF trans. Sec...	18.5
L23	3rd IF trans. Pri...	18.5
L24	3rd IF trans. Sec...	18.5
L25	Negative feed-back RF choke	130.0
L26	Speaker speech coil	1.8
L27	Hum neutralising coil	0.15
L28	Speaker field coil	700.0
T1	Speaker input trans. Pri...	137.0
	Sec...	0.3
	Pri., total	20.0
T2	Mains trans. Heater sec. (a, b)	0.1
	Heater sec. (c, d)	0.75
	Rect. heat. sec.	0.1
	HT sec., total	300.0
S1-S28	Waveband switches	—
S29, 30	Muting switches	—
S31	Mains switch, ganged R17	—

## VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 226 V, using the 225 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and both the volume and sensitivity controls were at maximum (the latter down), but there was no signal input.

Voltages were measured on the 400 V

scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH4A	257 Oscil. lator 117 12.0	1.6	56	3.7
V2 9D2	248	3.3	95	0.7
V3 9D2	250	3.1	95	0.7
V4 11D3	110	0.2	—	—
V5 Pen14	260	73.0	270	9.3
V6 R2	347†	—	—	—
T.I. TV4	18 Target 270 0.4	0.1	—	—

† Each anode, AC

## GENERAL NOTES

**Switches.**—S1-S28 are the waveband switches and are ganged in three rotary units beneath the chassis. They are indicated in our under-chassis view and are shown in detail on page VIII, where they are drawn as seen when looking from the rear of the underside of the chassis in the direction of the arrows.

The table gives the switch positions for the four control settings, starting from fully anti-clockwise. A dash indicates *open* and *C* *closed*.

**S29 and S30** are ganged muting switches of the QMB toggle type and are mounted on the rear member of the chassis, where they are marked "Mute," while they are indicated in our under-chassis view. They are open when the toggle is up ("On") and muting is applied, while they are closed when the toggle is down ("Off"), the receiver then being in its most sensitive state.

**S31** is the QMB mains switch, ganged with the tone control, **R17**.

**Coils.**—The RF and oscillator coils **L1-L18** are on eleven tubular formers in the screened compartments beneath the chassis. The IF transformers **L19, L20; L21, L22** and **L23, L24** are in three screened units on the chassis deck.

**L25** is an RF choke forming part of the negative feedback circuit for **V4**, and is mounted on the outside of the coil screening compartment, near the front member of the chassis.

**Scale Lamp.**—A special Osram tubular lamp with a double contact S.B. cap is used for scale illumination; it is rated at

Switch	LW	MW	SW2	SW1
S1	—	C	C	C
S2	—	—	C	C
S3	—	—	C	C
S4	—	C	C	C
S5	—	—	—	—
S6	C	—	—	—
S7	—	—	—	C
S8	—	—	C	C
S9	—	C	C	C
S10	—	—	C	C
S11	—	—	—	—
S12	—	C	—	—
S13	C	—	—	—
S14	—	—	—	C
S15	—	—	C	—
S16	—	C	—	—
S17	C	—	—	—
S18	—	—	—	C
S19	—	—	C	C
S20	—	C	C	C
S21	—	—	C	C
S22	—	—	C	C
S23	—	C	C	C
S24	—	—	C	—
S25	—	—	C	—
S26	—	C	—	—
S27	C	—	—	—
S28	—	—	C	C

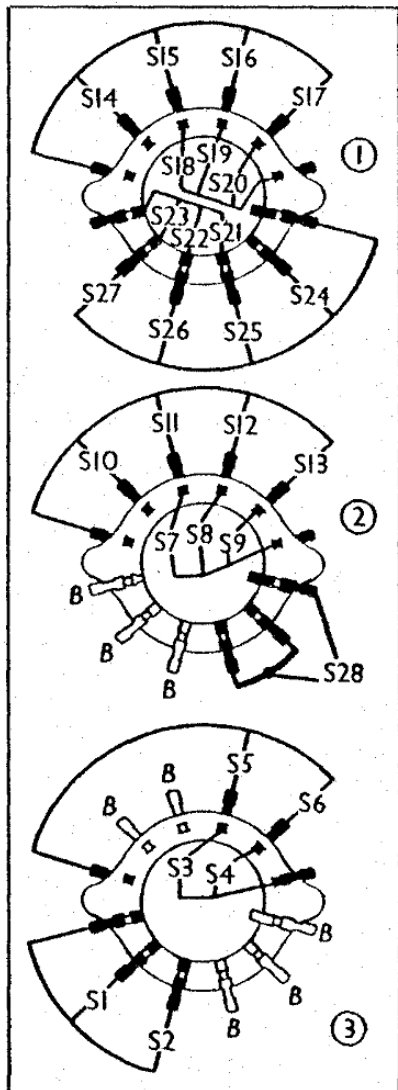
are provided at the rear of the chassis for a pick-up and the plug next to the pick-up sockets should be removed and connected to the upper socket, preventing radio break-through. The plug must be returned to the original socket for radio reception.

## CIRCUIT ALIGNMENT

**IF Stages.**—Connect signal generator to grid (top cap) of **V1** and chassis, inject a 464 KC/S signal and adjust **C44**, **C45**, **C46**, **C47**, **C48** and **C49** for maximum output, keeping the input as low as possible. The tuning indicator can be used as a visual indicator of resonance.

**RF and Oscillator Stages.**—When the gang condenser is fully in mesh the pointer should coincide with the vertical white line on right of scale. If not, unsolder drive wire from pointer carriage, adjust pointer and re-solder.

Diagrams of the three switch units, drawn as seen when looking from the rear of the under-side of the chassis, as indicated by the arrows in that view. A table showing which switches are open and closed in the various control settings is on the left.



**MW.**—Connect signal generator via a dummy aerial or 0.0005  $\mu$ F condenser to **A** socket, and **E**. Switch to **MW**, tune to small white dot on scale between the 210 and 220 m calibrations, inject a 1,400 KC/S (214.3 m) signal and adjust **C42**, **C30** and **C34** for maximum output, using the T.I. as a visual indicator.

Tune receiver to 500 m on scale, inject a 500 m (600 KC/S) signal, and adjust **C38** (nut) for maximum output. Check at 1,400 KC/S.

**LW.**—Switch set to **LW**, tune to 1,200 m on scale, inject a 1,200 m (250 KC/S) signal and adjust **C43**, **C31** and **C35** for maximum output. Tune receiver to red dot by the 1,700 m calibration mark, inject a 175 KC/S (1,714 m) signal and adjust **C39** (screw) for maximum output. Repeat adjustments until calibration is correct.

**SW2.**—Switch set to **SW2** (**SW1** on scale), tune to yellow dot between the 31 and 32 m calibration marks, inject a 9 MC/S (33.34 m) signal, and adjust **C41** and **C33** for maximum output.

**SW1.**—Switch set to **SW1** (**SW2** on the scale), tune to green dot between the 13 and 14 m calibration marks, inject a 22 MC/S (13.64 m) signal and adjust **C40** for maximum output.

K.B. 660—Continued